

WHAT IS CLAIMED IS:

1. An electrode comprising an intermetallic lithium/transition metal pnictide phase, wherein the transition metal present in said lithium/transition metal pnictide
5 phase is a metal of one of the columns IVa and Va of the periodic table of the elements.
2. An electrode according to claim 1, wherein the intermetallic lithium/transition metal pnictide phase is depicted by formula (I):
10
$$\text{Li}_x\text{M}_y\text{Pn}_4 \quad (\text{I}),$$
wherein:
 - M represents a metal of one of the columns IVa and Va of the periodic table of the elements;
 - Pn represents a pnictogene element selected in the group consisting of N,
15 P, As, and Sb;
 - x represents a number between 2.0 and 11.0; and
 - y represents a number between 0.2 and 2.2.
3. An electrode according to claim 1, wherein, in formula (I), M represents a
20 metal of the group consisting of Ti, V, Nb and Ta.
4. An electrode according to claim 2, wherein, in formula (I), y represents a number between 0.4 and 2.1.
- 25 5. An electrode according to claim 2, wherein, in formula (I), y represents a number between 0.7 and 1.3.
6. A process for making an electrode as described in claim 1, wherein the intermetallic lithium/transition metal pnictide phase is obtained by a method

comprising a step consisting of treating at a temperature ranging from 400°C to 1000°C a blend comprising:

- (i) a pnictogene element, in the elemental form and/or in the form of pnictide anions;
 - 5 (ii) lithium, in the metallic form and/or in the form of lithium cations; and
 - (iii) said transition metal of one of the columns IVa and Va of the periodic table of the elements, in a metallic form.
- 10 7. A process according to claim 6, wherein the treatment is carried out under inert atmosphere.
8. A process according to claim 6, wherein the molar ratio lithium
- 15 (ii)/pnictogene element (i)] is comprised between 2/4 and 11/4 in said blend; and the molar ratio [transition metal (iii)/pnictogene element (i)] being of between 0.2/4 and 2.2/4 in said blend.
9. A process according to claim 6 wherein the blend comprises:
- a lithium pnictide; and
- 20 45. said transition metal in a metallic form.
10. A process according to claim 6, wherein the intermetallic lithium/transition metal pnictide phase is obtained by a method comprising a step consisting of treating said blend at a temperature ranging from 800°C to 1000°C.
- 25 11. A process according to claim 6, wherein said blend further comprises lithium, in a metallic form.
12. A process according to claim 6, wherein the blend comprises:

- phosphorus or arsenic in the elemental state;
- metallic lithium; and

46. said transition metal, in a metallic form.

5 13. A process according to claim 6, wherein, after the thermal treatment, the blend is submitted to a quenching step.

14. A process according to claim 6, wherein, after the thermal treatment, the blend is submitted to a quenching step which is carried out by cooling the blend at
10 a temperature of less than 10°C, preferably more than -210°C.

15 15. A process according to claim 6, wherein, after the thermal treatment, the blend is submitted to a quenching step which is carried out in water or liquid nitrogen.

16. An electrochemical cell comprising a negative electrode, an electrolyte and a positive electrode, the negative electrode corresponding to a material containing an intermetallic lithium/transition metal pnictide phase, said transition metal being a metal of one of the columns IVa and Va of the periodic table of the elements.

20 17. An electrochemical cell according to claim 16, wherein the intermetallic lithium/transition metal pnictide phase is depicted by formula (I):



wherein:

- 25 - M represents a metal of one of the columns IVa and Va of the periodic chart of the elements;
- Pn represents a pnictogen element, that is N, P, or As;
 - x represents a number between 2.0 and 11.0; and
 - y represents a number between 0.2 and 2.2.

18. An electrochemical cell according to claim 17, wherein, in formula (I), M represents a metal of the group consisting of Ti, V, Nb and Ta.

19. A rechargeable lithium-ion battery which comprises a plurality of cells, electrically connected, each cell comprising a negative electrode, an electrolyte and a positive electrode, the negative electrode corresponding to a material containing an intermetallic lithium/transition metal pnictide phase, said transition metal being a metal of one of the columns IVa and Va of the periodic table of the elements.

20. A rechargeable lithium battery according to claim 19, wherein the intermetallic lithium/transition metal pnictide phase is depicted by formula (I):



wherein:

- M represents a metal of one of the columns IVa and Va of the periodic chart of the elements;

- Pn represents a pnictogene element, that is N, P, or As;

- x represents a number between 2.0 and 11.0; and

- y represents a number between 0.2 and 2.2.

21. A rechargeable lithium battery according to claim 20, wherein, in formula (I), M represents a metal of the group consisting of Ti, V, Nb and Ta.